

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET

(pursuant to NAC 445A.236)

Applicant: Bill Artamenko
Yaweh Farms
2480 Athens Avenue
Lincoln, CA 95648

Permit: NEV2004522

Location: Yaweh Farms
Parcel 03-341-06
Tomi Road, I-80 Exit 93
Toulon, Pershing County, Nevada
Latitude: 40° 3.5' N; Longitude 118° 40' W
Township 29 N, Range 25 E, Section 1 MDB&M

Public Water Supply: Not within a well protection zone.

General: The Applicant proposes to construct and operate a vermiculture/vermicompost facility to process a maximum of 11,000 wet tons per year of dewatered domestic septage to Class A biosolids standards at Yaweh Farms. Yaweh Farms is located 3 kilometers west of Toulon on the south side of Tomi Road, Pershing County, Nevada. To be eligible for public distribution, the metals concentrations in the castings must be below the biosolids pollutant concentration limits and adequate pathogen reduction must be demonstrated. The vermicast is proposed to be sold to nurseries and horticulturists as potting material.

After a successful pilot study, the Orange County (Florida) Environmental Protection Division demonstrated in 1999 that under controlled conditions, the US EPA required three- to four log reduction of pathogen indicators in the biosolids was attained through vermiculture. Test row samples showed a 6.4-log reduction in fecal coliform, an 8.6-log reduction in *Salmonella* sp., a 4.6-log reduction in enteric viruses, and a 1.9-log reduction in helminth ova. All of these reductions were greater than in the control biosolids. Based on experimental analyses from both the pilot and the full-scale operation, vermiculture can be used to treat pathogens and potentially meet Class A pathogen standards. To achieve Class A reduction, the pathogenic bacteria, viruses, protozoa, and helminth ova must be reduced to below detectable levels.

The Applicant proposes to construct 200-foot long by 8.5 feet wide by 3 feet deep trenches on a 300-foot by 300-foot compacted soil processing pad to contain multiple vermiculture treatment cells. The pad soil will be screened to exclude material larger than 1-inch with 2 inches of pea gravel in the bottom of the trenches for further liner protection. Individual poly vinyl chloride (PVC)-lined treatment cells, 130 to 175 per year, will be assembled for each 21- to 24-cubic yard load of dewatered septage delivered to the processing pad. The 30-mil PVC will be UV-protected. These cells will be approximately 8.5 feet wide by 3 feet deep by 22 feet long.

The domestic septage will be dewatered in screen boxes by gravity using polymer to aid in solids separation. The dewatering process will take place at a facility operated by the Applicant as Inviro-Tec located in Lincoln, California with liquid discharge to the local sewer system, Pleasant Grove Wastewater Treatment Plant – Permit CA0084573. Lime will be metered into the liquid septage as it is pumped into the dewatering boxes. Under normal dewatering, without lime addition, the solids content is between 20 and 23%. However, further moisture loss occurs with the heat of reaction when the pH is raised to 12 or above for 24 hours. This causes the septage to have a solids content of 40-50%.

Dewatered domestic septage (DDS) will be hauled to the facility in Nevada Health Division permitted trailers and placed in the PVC-lined treatment cells. The DDS will be sealed in the liner to preserve moisture for approximately 3 months. This resting period will allow the pH to return to approximately neutral. When the DDS has returned to a near neutral state, the moisture content will be increased to approximately 75% and *Eisenia foetida* and/or *Lumbricus rubellis* will be added to the DDS. These annelids prefer a slightly acidic pH level of approximately 6.5 standard units and a dark environment due to their photosensitive epidermis. The annelids require a moist, organic substrate in which to live.

The vermiculture process is expected to take approximately 6 months per cell, but is temperature dependent. The optimal temperature range for these annelids is 13 to 25 degrees Celsius but they can survive a wide range of temperatures.

Process make-up water will be irrigation ditch water purchased from a ranch east of the facility and hauled to the site via water truck. Although elevated in total dissolved solids (TDS), the Applicant has determined that the irrigation ditch water is of adequate quality as not to impair annelid growth. There are no wells at the facility.

The vermicompost will be processed through a 3/8-inch trammel screen to remove the annelids for further use and inappropriate material, i.e. plastics. The vermiculture facility shall be operated in accordance with the Operations and Maintenance (O&M) Manual that must be approved by the Division.

Receiving Water Characteristics: The groundwater at the facility is reported to be at a depth in excess of 10 feet below ground surface. There are no wells within a one-mile radius of the facility. The nearest well, 25/30-8c1, is approximately 1.8 miles east of the facility. This well was drilled to 210 feet in 1936 and had a static water level of 14.7 feet in 1946. The next closest well, 26/30-27a1, to the proposed site is located approximately 5 miles to the north-northeast. This 8-inch well was drilled in the alluvial deposits to a depth of 34 feet with a reported static water level of 7 feet in 1954.

A 1965 Water Resource Appraisal of Lovelock Valley, reported that the Well 26/30-27a1 water had a specific conductance of 5,150 micromhos with alkali and salinity hazards defined as high and an elevated boron concentration. The Appraisal determined that this water was unsuitable for irrigation. Other more distant Lower Lovelock wells in the fine grained lacustrine strata also have sodium chloride type water with 1965 TDS concentrations in the 1,600 mg/L to 1,800 mg/L range. Due to well depth and screened interval, data from Well 26/30-27a1 was not provided in the permit application.

Groundwater monitoring has not been proposed for this facility.

Flow: The Applicant will be authorized to transport a maximum of 11,000 wet metric tons per year of dewatered domestic septage for vermiculture to the facility. The dewatered septage is expected to have a solids content of 40–50 %.

Proposed Effluent Limitations: During the period beginning on the effective date of this permit and lasting until the permit expires, the Applicant is authorized to:

- Vermicompost domestic septage provided by the Inviro-Tec of Lincoln, CA at Yaweh Farms, Toulon, Nevada ; and
- Distribute the vermicompost material that meets metals and pathogen standards without restriction.

Samples taken in compliance with the monitoring requirements specified below shall be collected at the following locations:

- a. Dewatered domestic septage delivered to the facility;

- b. Septage and/or vermicompost undergoing treatment or stored at the facility;
- c. Each vermicomposted treatment cell prior to removal from the facility; and
- d. Vermicompost transported from the facility.

The dewatered domestic septage and vermicompost shall be limited and monitored by the Applicant as specified below:

MONITORING

BIOSOLIDS CHARACTERISTICS	DISCHARGE LIMITATIONS	MONITORING REQUIREMENTS		
		Sample Location	Measurement Frequency	Sample Type
Dewatered Septage Delivered (wt)	11,000 ¹	a.	Daily	Calculate
Resting ² Dewatered Domestic Septage (wt)	Monitor & Report	b.	Quarterly	Calculate
Vermicomposting Re-hydrated Septage (wt)	Monitor & Report	b.	Quarterly	Calculate
Vermicompost Stored (wt)	Monitor & Report	b.	Quarterly	Calculate
Total Septage and Vermicompost (wt)	12,000	b.	Quarterly	Calculate
Total Vermicompost Removed (wt)	Monitor & Report	d.	Daily ³	Calculate
Arsenic (mg/Kg)	41	c.	Each Cell	Composite
Cadmium (mg/Kg)	39	c.	Each Cell	Composite
Chromium (mg/Kg)	1200	c.	Each Cell	Composite
Copper (mg/Kg)	1500	c.	Each Cell	Composite
Lead (mg/Kg)	300	c.	Each Cell	Composite
Mercury (mg/Kg)	17	c.	Each Cell	Composite
Molybdenum (mg/Kg)	75	c.	Each Cell	Composite
Nickel (mg/Kg)	420	c.	Each Cell	Composite
Selenium (mg/Kg)	36	c.	Each Cell	Composite
Zinc (mg/Kg)	2800	c.	Each Cell	Composite
Fecal Coliform (MPN/g) or	1,000	c.	Each Cell ^{4, 5}	Composite
<i>Salmonella</i> sp. (MPN/4 g)	3			
Enteric Viruses (PFU/4 g)	1	c.	Each Cell ^{4, 5}	Composite
Viable Helminth Ova (/4 g)	1	c.	Each Cell ^{4, 5}	Composite

Footnotes:

1. Annual Total; report daily dewatered septage delivered to the facility on a quarterly basis.

2. Resting – Period for limed dewatered domestic septage to return to an approximately neutral state.
3. Report daily total vermicompost transported from the facility on a quarterly basis.
4. Vermicompost must be transported off-site within 15 days of receiving pathogen data meeting the permit limitations from a certified laboratory or the vermicompost must be re-characterized for pathogens.
5. After vermicomposting at least 11,000 wet tons of dewatered domestic septage with pathogen indicator compliance of 100% and demonstration that pathogen reduction can be achieved throughout the year, the Permittee may request a reduction in the frequency of pathogen characterization as a minor modification.

mg/Kg: Milligrams per dry kilogram.
MPN: Most probable number.
/4 g: Per four grams.

wt: Wet metric tons.
PFU: Plaque forming unit.

Schedule of Compliance: The Applicant shall implement and comply with the provisions of the schedule of compliance after approval by the Administrator, including in said implementation and compliance, any additions or modifications that the Administrator may make in approving the schedule of compliance.

- a. The Applicant shall achieve compliance with the effluent limitations upon issuance of the permit.
- b. Within ninety (90) days of the completion of processing pad construction, the Applicant shall submit to the Division for review and approval an Operations and Maintenance Manual for the vermiculture facility.

Rationale for Permit Requirements: Permit requirements are necessary to protect the public from pathogens and metals that may be present in the domestic septage, to protect waters of the State from degradation by this material, and to prevent the vermiculture facility from becoming a public nuisance.

Flow: The permit allows the Applicant to transport up to 11,000 wet tons of dewatered domestic septage to the facility for vermicomposting. The Applicant requested this discharge limitation and has sized the process pad accordingly.

To avoid having large amounts of dewatered septage and/or vermicompost accumulate at the facility, a limit of 12,000 wet tons of these materials stored at the facility at any time is established by the permit.

Metals: To qualify for unrestricted distribution, the arsenic, cadmium, chromium, copper, lead mercury, molybdenum, nickel, selenium, and zinc concentrations of the vermicompost must be below the biosolids pollutant concentration limits established by Title 40 of the Code of Federal Regulations, Part 503 (40 CFR Part 503). The limits for each of these metals are contained in the Proposed Effluent Limitations section of this fact sheet.

Due to the potentially high variability of domestic septage and the lack of State control over the sources of this septage, the metals concentrations of each treatment cell must be determined prior to distribution. Analysis of a composite sample from each cell is required.

Pathogens: Per 40 CFR Part 503, to qualify for unrestricted distribution, the density of fecal coliform shall be less than 1,000 most probable number (MPN) per gram of total solids or the density of *Salmonella* sp. bacteria shall be less than 3 MPN per 4 grams of total solids, the density of enteric viruses shall be less than 1 Plaque-forming Unit per 4 grams of total solids, and the density of viable helminth ova shall be less than 1 per 4 grams of total solids. All pathogen densities shall be determined on a dry weight basis.

Due to the many variables involved in the vermiculture process, a composite sample of the vermicompost from each treatment cell must be analyzed for pathogen density. Pathogen reduction processes affected by local climatic conditions require more frequent pathogen analyses. This sampling must be scheduled so that the vermicompost is transported off-site within 15 days of receiving the pathogen analysis results from the State certified laboratory. 40 CFR Part 503 requires the pathogen analyses at the time the sewage sludge is used or disposed, at the time the sewage sludge is prepared for sale or give away in a bag or other container for

application to the land, or at the time the sewage sludge is prepared to meet the requirements in §503.10 (b), (c), (e), or (f). Due to concerns regarding pathogen re-growth, the vermicompost must be re-analyzed for pathogens, if the material remains at the facility for more than 15 days after the lab results are received by the Applicant.

After vermicomposting at least 52 cells, 21 to 24 cubic yards each, of dewatered domestic septage with pathogen indicator compliance of 100% and demonstration that pathogen reduction can be achieved throughout the year, the Permittee may request a reduction in the frequency of pathogen characterization. Vermiculture has been demonstrated as an effective pathogen reduction process in climates milder than northeastern Nevada. Vermicomposting the maximum annual amount of dewatered domestic septage over at least one year while meeting the pathogen limitations for each cell will demonstrate that vermiculture is a viable option to attain Class A pathogen standards at this location.

Proposed Determination: The Division has made the tentative determination to issue the proposed permit for a five (5) year period.

Procedures for Public Comment: Notice of the Division's intent to issue a permit authorizing the Applicant to vermicompost domestic septage to Class A biosolids standards at Yaweh Farms subject to the conditions contained within the permit, is being sent to the **Lovelock Review-Miner** and the **Reno Gazette-Journal** for publication. The notice is being mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit can do so in writing until 5:00 P.M. August 12, 2005, a period of 30 days following the date of the public notice. The comment period can be extended at the discretion of the Administrator.

A public hearing on the proposed determination can be requested by the applicant, any affected State or interstate agency, the Regional Administrator of EPA Region IX or any interested agency, person or group of persons. The request must be filed within the comment period and indicate the interest of the person filing the request and the reasons why a hearing is warranted. Public hearings granted by the Division shall be conducted in accordance with NAC 445A.238.

The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.238.

Prepared by: Bruce Holmgren
July 2005

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